



Tor Shield

Energy Management System

Edge Gateways | Platform | Application & Analytics



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With a host of machines working in tandem in any manufacturing setup, real-time information about them is seldom captured.

This poses challenges in monitoring machines' health, finding energy hotspots, meeting compliance norms and driving energy efficiency initiatives. This lack of data prevents companies from averting machine breakdowns and unplanned downtimes.

Over the last 8 years, we have been working on several use cases in the energy management space. This has allowed us to dig deeper into the challenges and come up with targeted solutions to cater to them.

The Tor Energy Management suite covers solutioning, edge gateways, state-of-the-art IoT Platform, customizable applications, analytics and services.

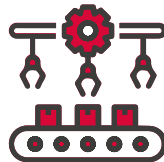
Industry Coverage

- Manufacturing Plants
- Machine Shops
- Foundries
- Continuous Process Plants
- ITES
- Commercial Complexes
- Schools

Energy Management Challenges



Limited visibility about the availability, loss and usage of energy



No granular visibility of load level consumption to link it back to machine productivity



Difficult to track the ROI of energy conservation initiatives



No mechanism to monitor the power quality & meet compliance norms



Manual capturing of energy logs leading to manual errors



No auto alert mechanism in the event of any abnormal electrical parameters

Introducing Tor Shield

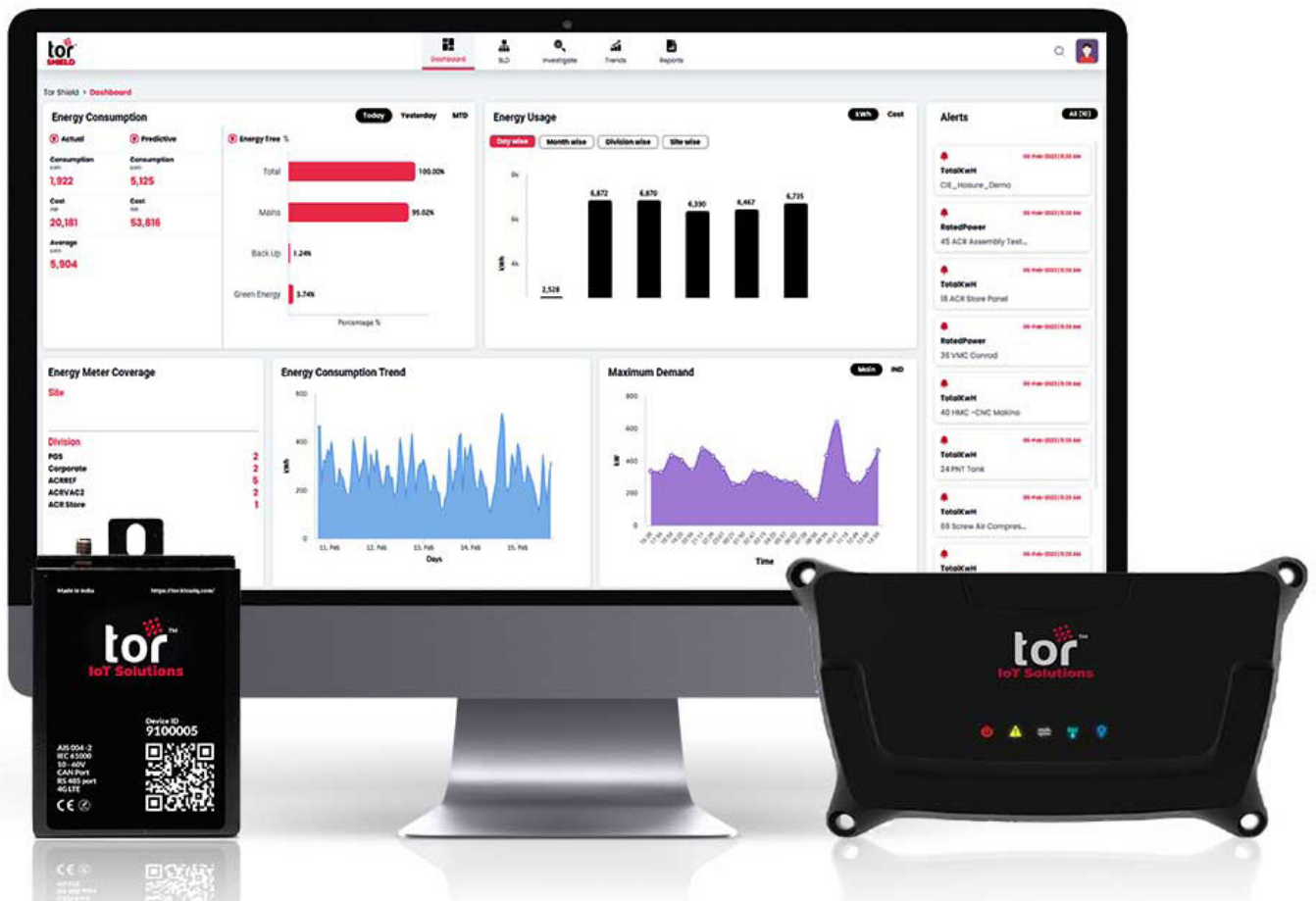
Tor Shield is a modular energy management system aimed at giving complete visibility and control of the electricity consumption across any manufacturing setup.

Through **Tor Shield's** web application, source-level, panel-level, as well as individual machine level data can be monitored. This granular visibility can help companies **drive energy conservation initiatives** as well as **preventive maintenance schedules**. Each machine is fitted with a multi-function energy meter that transmits data via our proprietary edge gateway over the cloud which is then displayed over the application.

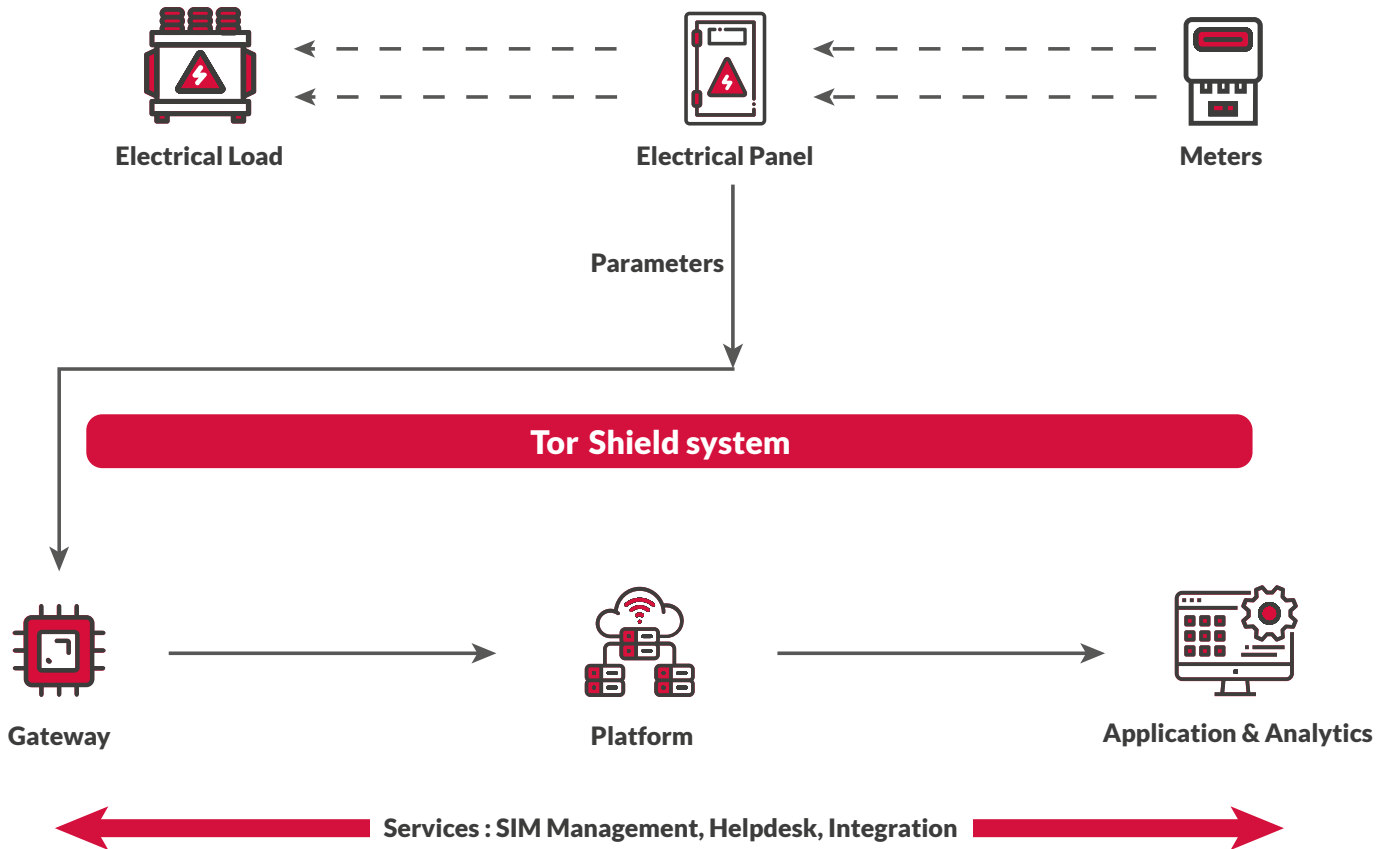
The data also feeds into our proprietary **Shield**

Insights which provides actionable insights e.g. **best & worst performing machines, hierarchy based electricity consumption analysis, specific energy consumption, savings due to energy efficiency measures, loss of power/availability analysis, harmonic analysis and power quality index based on voltage and current THD, auto generated reports, live alerts and warnings via email and WhatsApp & more.** Also all energy parameters' data log can be further analysed graphically.

The **plug and play module** of Tor Shield provides unmatched security and is designed to work in harsh conditions. The application comes with an **inbuilt library of energy meters** which makes front-end configuration hassle-free.



End to end energy management IoT solution



Get the maximum out of your energy efficiency initiatives with Shield Insights.

- **Best & worst performing machines**
(Actual vs Rated)
- **Track saving due to energy efficiency measures**
(Rs Value)
- **Machine/ Feeder focused priority list**
(Based on deviations, Inrush current and pf)
- **Loss of power/availability analysis**
(% value Month wise, week wise drill down)
- **Hierarchy based energy consumption analysis**
(KwHr drill down day, week, month)
- **Alarm history**
- **Production line's specific energy consumption analysis**
(KwHr drill down day, week, month)
- **Cost analysis**
(Monthwise bill details drilldown)
- **Maximum demand analysis at plant**
(Maximum demand trend line)
- **Harmonic analysis and Power quality index based on voltage and HD**
(V THD, I THD trend line)
- **Priority action plan dialog box**

Edge Gateways

Tor Iota



- Operating Voltage - 10 to 35V
- CE & RoHS certification
- Web-based configurable utility
- Remotely configurable over FOTA
- RS 485/ RS 232

Tor One



- Operating Voltage - 10 to 35V
- CE & RoHS certification
- Web-based configurable utility
- Remotely configurable over FOTA
- Can 2.0 , Ethernet 10/100, RS 485, RS 232

EMS Panel



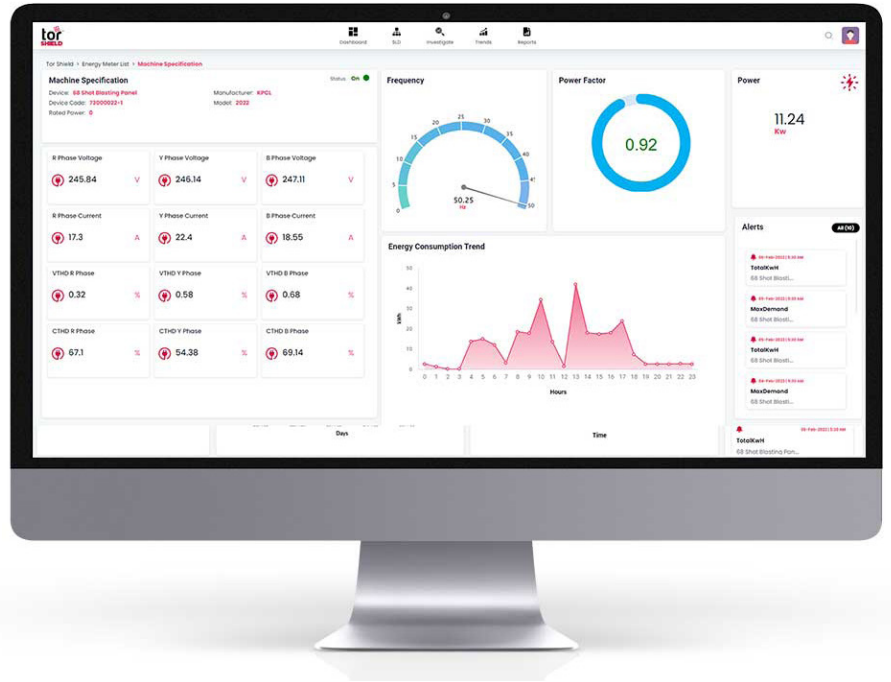
- Integrated Energy Meter
- AC Supply through SMPS (240V AC)
- CE & RoHS certification
- Web-based configurable utility
- Remotely Configurable over FOTA
- RS 485/ Rs 232

Application

Front end configuration of gateway and plant single line diagram for monitoring

DIY installation of gateway guided by a video

Compatible with major multi function panel meters for easy deployment



Inbuilt standardized energy meter library for easy configuration



Note: Tor Shield supports other energy meters configuration too.

Analytics

Key parameter coverage

Live monitoring	Voltages, Currents, Active Power, Reactive Power, Apparent Power, Kw-hr, KVA-hr, Pf, THD
Dashboard	Energy consumption trends, Cost trends, Maximum demand, Pie charts
Drill down	Organisation level, Plant level, Section level, Load level views
Analytics	Insights, Graphical analysis, Time series analysis
Reports	Section wise daily log, equipment wise daily log, Min, Max average report
Alarms and warnings	User settable based on threshold values
Add-on features	Bus-bar temperature monitoring, breaker status
Birds eye view	Single line diagram with parent - child relationship
Meter configuration	Web configuration with standard libraries and user settable MODBUS RTU commands

Key Features

1 Single line diagram view

2 Patented Shield insights for driving energy efficiency initiatives

3 Centralized load manager

4 Complete electrical parameter monitoring

5 Standard energy meter library for plug and play installation

6 Energy efficiency ROI calculator

7 Specific energy consumption visibility at shop/line/machine level

8 Live alerts and warnings

9 Industry specific reports

Capabilities

1 RnD

Technology refinement by 100+ inhouse team of engineers and subject matter experts in embedded systems, hardware development, type testing - validation, application and platform development.

2 Application & Analytics

Expertise in developing and deploying customized applications with platform and database development along with managing infrastructure and security.

3 Manufacturing

Hardware manufacturing in state-of-the-art pick and place setup for board building with code burning bank for multi-board production in parallel.



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